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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

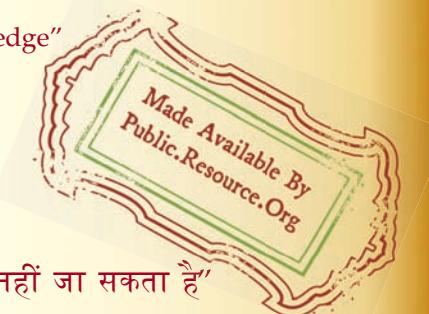
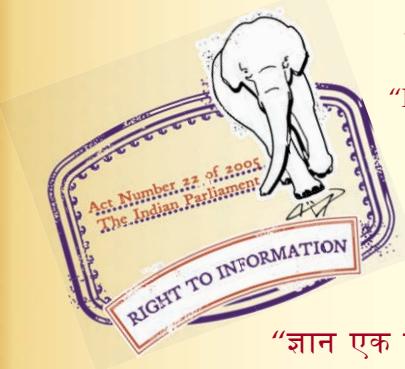
“Step Out From the Old to the New”

IS 8909-4 (1978): Fixed resistors, general purpose, power,
Part 4: Type FRP 3 [LITD 5: Semiconductor and Other
Electronic Components and Devices]

“ज्ञान से एक नये भारत का निर्माण”

Satyanaaranay Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartṛhari—Nītiśatakam

“Knowledge is such a treasure which cannot be stolen”



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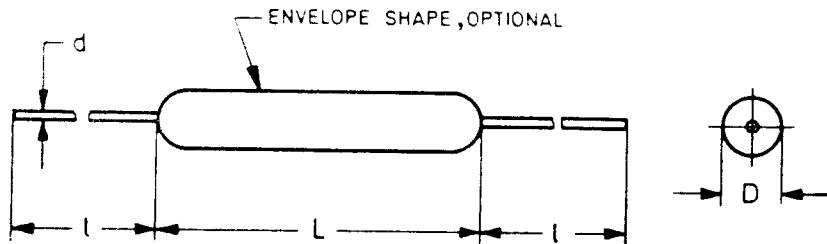


Indian Standard

**SPECIFICATION FOR
FIXED RESISTORS, GENERAL PURPOSE, POWER
PART IV TYPE FRP3**

0. General — This standard shall be read in conjunction with IS : 8909 (Part I) - 1978 ' Specification for fixed resistors, general purpose, power: Part I General requirements and methods of tests '.

1. Outline and Dimensions — The outline and dimensions shall be according to Fig. 1 and Table 1.



Typical Construction : Wire-wound, silicon cement coated, non-insulated

FIG. 1 OUTLINE AND DIMENSIONS

TABLE 1 DIMENSIONS AND RATINGS

Style	Rated Dissipation (W at 70°C)	Dimensions, mm				Rated Limiting Element Voltage VDC or RMS	Resistance Range	Critical Resistance
		L Max	D Max	d	l Min			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FRP 3-2.5	2.5	13	5.6	0.8 ± 0.05	30	100	1 Ω to 10 K Ω	4 K Ω
FRP 3-5.0	5.0	23	8	1.0 ± 0.1	30	250	1 Ω to 22 K Ω	12.5 K Ω
FRP 3-8.0	8.0	45	8	1.0 ± 0.1	30	500	1 Ω to 68 K Ω	31.25 K Ω
FRP 3-10.0	10.0	54	8	1.0 ± 0.1	30	750	1 Ω to 100 K Ω	56.25 K Ω

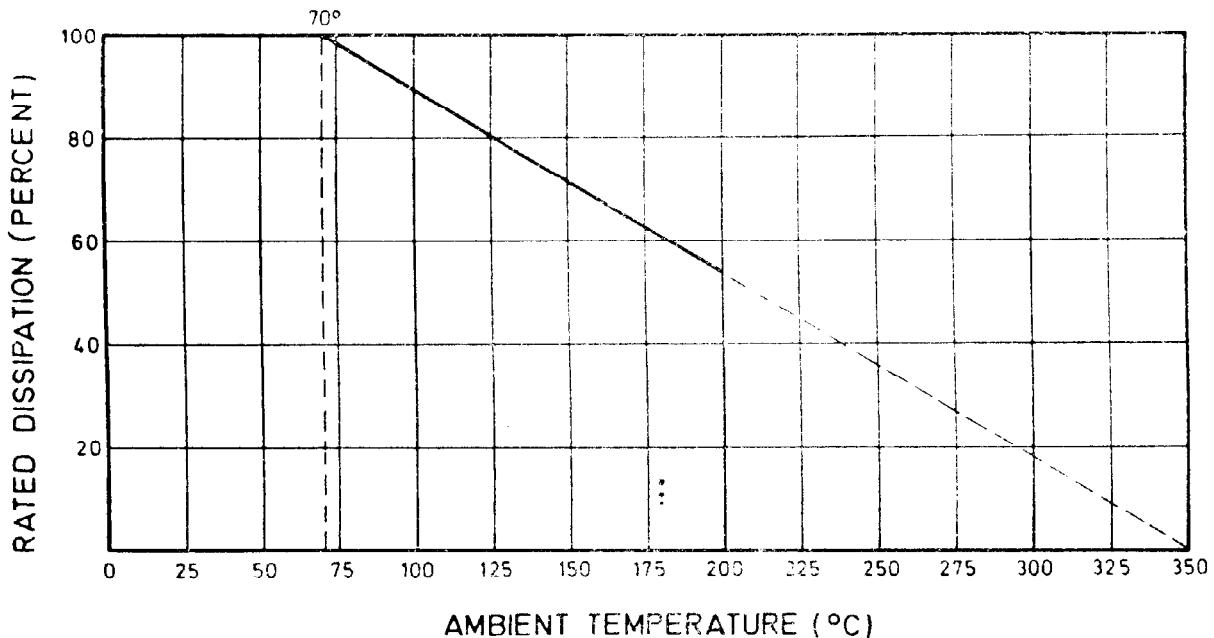
2. Ratings — Ratings shall be as specified in Table 1.

Note — For rated dissipation at temperature other than 70°C, reference should be made to the derating curve shown in 4.

3. Characteristics

- | | |
|--------------------------------|-------------------------------|
| a) Selection tolerance | ± 5 percent |
| b) Stability class | ± 5 percent |
| c) Temperature coefficient | ± 200 ppm/°C |
| d) Vibration | 10 to 2 000 Hz; 20 g, 3 × 4 h |
| e) Shock | 1 km/s ² |
| f) Acceleration | 1 km/s ² |
| g) Bump | 4 000 bumps, 40 g |
| h) Maximum surface temperature | 350°C |
| j) Climatic category | 55/200/56 |

4. Derating Curve



5. Marking — See 7 of IS : 8909 (Part I)-1978.

6. Material, Construction and Workmanship — See 5 of IS : 8909 (Part I)-1978.

7. Classification of Tests — See 8.1 of IS : 8909 (Part I)-1978.

7.1 General Conditions for Tests — See 8.2 of IS : 8909 (Part I)-1978. The same measuring set shall be used for any one test but not necessarily for all the tests.

7.1.1 The test schedule and the requirements shall be in accordance with Table 2.

TABLE 2 TEST SCHEDULE AND REQUIREMENTS

Sl No.	Test	Clause Ref in IS : 8909 (Part I)-1978	Condition of Test	Requirement
(1)	(2)	(3)	(4)	(5)
I) All Samples				
	a) Visual examination	8.4.1	—	The workmanship and finish shall be satisfactory. The marking shall be legible. Materials used as coating or enclosure shall not extend by more than 2 mm along the terminal beyond the body of the resistor.
	b) Dimensions	8.4.2	—	The dimensions of the resistors and their terminations shall conform to values given in Table 1 read with Fig. 1.
	c) Resistance	8.3.1	—	The resistance value at 27°C shall correspond with the rated resistance taking into account the tolerance.
II) First Group				
	a) Solderability	8.4.6	—	—
	1) Visual examination	8.4.1	—	There shall be no damage.
	b) Robustness of resistor body	8.4.4	—	—
	1) Visual examination	8.4.1	—	There shall be no damage.

(Continued)

TABLE 2 TEST SCHEDULE AND REQUIREMENTS -- *Contd*

SI No.	Test	Clause Ref in IS : 8909 (Part I)-1978	Condition of Test	Requirement
(1)	(2)	(3)	(4)	(5)
c)	Robustness of terminations	8.4.5	—	—
1)	Visual examination	8.4.1	—	There shall be no damage.
2)	Resistance	8.3.1	—	Change in resistance value shall not exceed ± 0.2 percent or 0.05 ohms whichever is greater.
d)	Jump*	8.4.8	—	—
1)	Visual examination	8.4.1	—	There shall be no damage.
2)	Resistance	8.3.1	—	Change in resistance value shall not exceed ± 0.5 percent or 0.05 ohms whichever is greater.
e)	Vibration*	8.4.7	10 to 2 000 cycles, 20 g, duration 3 x 4h	—
1)	Visual examination	8.4.1	—	There shall be no damage.
2)	Resistance	8.3.1	—	Change in resistance value shall not exceed ± 0.5 percent or 0.05 ohms whichever is greater.
f)	Shock*	8.4.9	1 km/s ²	—
1)	Visual examination	8.4.1	—	There shall be no damage.
2)	Resistance	8.3.1	—	Change in resistance value shall not exceed ± 0.5 percent or 0.05 ohms whichever is greater.
g)	Acceleration*	8.4.10	1 km/s ²	—
(steady state)				
1)	Visual examination	8.4.1	—	There shall be no damage.
2)	Resistance	8.3.1	—	Change in resistance value shall not exceed ± 0.5 percent or 0.05 ohms whichever is greater.
h)	Rapid change of temperature	8.5.3	—	—
1)	Resistance	8.3.1	—	Change in resistance value shall not exceed ± 2.0 percent or 0.05 ohms whichever is greater.
k)	Climatic sequence	8.5.1	—	—
1)	Dry heat	8.5.1.2	At maximum category temperature (+ 200°C)	—
2)	Damp heat (accelerated) — first cycle	8.5.1.3	One cycle	—
i)	Visual examination	8.4.1	—	There shall be no damage.
3)	Cold	8.5.1.4	Two hours at minimum category temperature (- 55°C)	—
i)	Visual examination	8.4.1	—	There shall be no damage.
4)	Low air pressure	8.5.1.5	Degree of severity : 1 kPa (Approximate altitude 30 000 m). The voltage shall be applied between terminations.	There shall be no breakdown or spark or flashover.

*Throughout the test, the resistors shall be connected to a suitable monitoring device to determine electrical discontinuity. It is desirable that the detecting equipment shall detect any interruption with a duration of 0.1 millisecond or greater.

(Continued)

TABLE 2 TEST SCHEDULE AND REQUIREMENTS—*Contd*

Sl. No.	Test	Clause Ref in IS : 8909 (Part I)-1978	Condition of Test	Requirement
(1)	(2)	(3)	(4)	(5)
	5) Damp heat (Accelerated)—remaining cycles	8.5.1.6	—	—
	i) Visual examination	8.4.1	—	There shall be no damage.
	ii) Resistance	8.3.1	—	Change in resistance value shall not exceed ± 5.0 percent or 0.05 ohms whichever is greater.
III)	<i>Second Group</i>			
	a) Damp heat (long term)	8.5.2	The loading shall be 50 percent of the rated wattage or the limiting voltage whichever is less.	—
	1) Visual examination	8.4.1	—	There shall be no damage.
	2) Resistance	8.3.1	—	Change in resistance value shall not exceed ± 5.0 percent or 0.05 ohms whichever is greater.
IV)	<i>Third Group</i>			
	a) Endurance	8.6.3	—	—
	1) Resistance	8.3.1	—	Change in resistance value shall not exceed ± 5 percent or 0.05 ohms whichever is greater.
	b) Flammability	8.6.4	—	—
V)	<i>Fourth Group</i>			
	a) Short term overlead	8.3.6	i) 5 times the rated voltage for style FRP3-2.5 ii) 10 times the rated voltage for other styles.	—
	1) Resistance	8.3.1	—	Change in resistance value shall not exceed ± 2.0 percent or 0.05 ohms whichever is greater.
	b) Mould growth	8.6.1	—	—
VI)	<i>Fifth Group</i>			
	a) Resistance to solvents	8.6.5	—	—
VII)	<i>Sixth Group</i>			
	a) Temperature coefficient	8.3.4	—	± 200 ppm/ $^{\circ}$ C
	b) Temperature rise (applicable to critical value and below)	8.3.5	—	Temperature rise shall not exceed 280 $^{\circ}$ C.
	c) Salt mist	8.6.2	—	—